CLAIMS

We claim:

1. A method comprising:
providing a layer 3 virtual private network (VPN) to a first customer;
providing backbone access to a second customer; and
maintaining on a single network element a first set of information for the first customer separately from a second set of information for the second customer.

2. The method of claim 1 wherein the first set of information includes configuration information for the layer 3 VPN and the second set of information includes configuration information for the second customer.

3. The method of claim 1 wherein the first set of information includes routing information for the layer 3 VPN and the second set of information includes routing information for the second customer.

4. The method of claim 1 further comprising maintaining on the network element a set of non-VPN related information for the first customer.

5. The method of claim 1 further comprising:
providing a second layer 3 VPN to a third customer;
maintaining on the single network element a third set of information for the second layer 3 VPN; and
maintaining a single exterior gateway protocol process table for the first layer 3 VPN and the second layer 3 VPN.

6. A computer implemented method comprising:

maintaining a first set of information for a first layer 3 virtual private network (VPN), the first set of information including a first value identifying the first layer 3 VPN;

separately maintaining a second set of information for a second layer 3 VPN, the second set of information including a second value identifying the second layer 3 VPN;

associating the first value with a first route distinguisher;

associating the second value with a second route distinguisher; and

maintaining a single exterior gateway protocol (EGP) table for the first and second layer 3 VPNs.

7. The computer implemented method of claim 6 further comprising:

separately maintaining a third set of information for a non-VPN customer, the third set of information including a third value identifying the non-VPN customer; and

maintaining a second EGP table for the non-VPN customer.

8. The computer implemented method of claim 6 further comprising:

maintaining a first routing table for the first layer 3 VPN;

maintaining a second routing table for the second layer 3 VPN;

updating a set entries for the first layer 3 VPN in the single EGP table, each of the set of entries indicating the first route distinguisher;

mapping the first route distinguisher to the first value; and

indicating the mapped first value in communication about the updated set of entries.

9. The computer implemented method of claim 6 further comprising:

maintaining a data structure for the single EGP table, the data structure indicating the association between first value and the first route distinguisher and between the second value and the second route distinguisher; and

performing mappings between the first value and the first route distinguisher and between the second value and the second route distinguisher with the data structure.

10. A network element comprising:

a control card to host an exterior gateway protocol (EGP) process and an interior gateway protocol (IGP) process;

a machine readable medium coupled with the control card, the machine readable medium having a set of instructions to cause the network element to maintain a first set of information for a first layer 3 virtual private network (VPN) and separately maintain a second set of information for a second layer 3 VPN, to maintain a single exterior gateway protocol (EGP) table for the first layer 3 VPN and the second layer 3 VPN, to identify the first layer 3 VPN with a first value and to identify the second layer 3 VPN with a second value, and to associate a first route distinguisher (RD) with the first value and a second RD with the second value;

a line card coupled with the control card, the first line card to process traffic for the first layer 3 VPN and the second layer 3 VPN;

a first interface coupled with the line card, the first interface to receive traffic for the first layer 3 VPN; and

a second interface coupled with the line card, the second interface to receive traffic for the second layer 3 VPN.

11. The network element of claim 10 further comprising:

a second line card coupled with the control card and the line card, the second line card to process traffic for the first layer 3 VPN; and

a third interface coupled with the second line card, traffic for the first layer 3 VPN to be received through the third interface.

12. The network element of claim 10 wherein the set of instructions also cause the network element to maintain a data structure to performing mappings between the first value and the first RD and between the second value and the second RD.

13. The network element of claim 10 wherein the set of instructions also cause the network element to maintain a third set of information for a non-VPN customer separately from the first and second sets of information, the third set of information including a third value identifying the non-VPN customer and to maintain a second EGP table for the non-VPN customer.

14. A system comprising:

a first piece of customer equipment to transmit and receive traffic within a first layer 3 virtual private network (VPN);

a second piece of customer equipment to transmit and receive traffic within a second layer 3 VPN; and

a network element coupled with the first piece of customer equipment and the second piece of customer equipment, the network element to maintain a first set of information for the first layer 3 VPN and separately maintain a second set of information for the second layer 3 VPN, the first set of information to include a first value identifying the first layer 3 VPN and the second set of information to include a second value identifying the second layer 3 VPN, to maintain a single shared exterior gateway protocol (EGP) table for the first layer 3 VPN and the second layer 3 VPN, and to associate the first value with a first route distinguisher (RD) and the second value with a second RD.

15. The system of claim 14 wherein the first and second pieces of customer equipment correspond to a single entity.

16. T he system of claim 14 wherein the first and second pieces of customer equipment correspond to different entities.

17. The system of claim 14 further comprising the network element to separately maintain a third set of information for a non-VPN customer and to maintain a second EGP table for the non-VPN customer.

18. The system of claim 14 further comprising the network element to exchange update messages with the first and second pieces of customer equipment.

19. The system of claim 14 wherein the network element also maintains a data structure to perform mappings between the first value and the first RD and between the second value and the second RD.

20. A machine-readable medium that provides instructions, which when executed by a set of one or more processors, cause said set of processors to perform operations comprising:

maintaining separate exterior gateway protocol (EGP) tables for non-virtual private network (VPN) customers;

maintaining a single shared EGP table for layer 3 VPN customers; and

associating individual layer 3 VPNs with individual route distinguishers (RDs).

21. The machine-readable medium of claim 20 wherein associating individual layer 3 VPNs with individual RDs comprises:

identifying each layer 3 VPN with an identifier; and

mapping the identifier to an RD for a corresponding layer 3 VPN.

22. The machine-readable medium of claim 20 further comprising assigning each non-VPN customer.

23. A machine-readable medium that provides instructions, which when executed by a set of one or more processors, cause said set of processors to perform operations comprising:

maintaining a first set of information for a first layer 3 virtual private network (VPN), the first set of information including a first value identifying the first layer 3 VPN;

separately maintaining a second set of information for a second layer 3 VPN, the second set of information including a second value identifying the second layer 3 VPN;

associating the first value with a first route distinguisher (RD);

associating the second value with a second RD;

maintaining a data structure to perform mappings between the first value and the first RD and between the second value and the second RD; and

maintaining a single exterior gateway protocol (EGP) table for the first and second layer 3 VPNs.

24. The machine-readable medium of claim 23 further comprising:

separately maintaining a third set of information for a non-VPN customer, the third set of information including a third value identifying the non-VPN customer; and

maintaining a second EGP table for the non-VPN customer.

25. The machine-readable medium of claim 23 wherein the mappings are performed for communications about the single EGP table.

26. A machine-readable medium that provides instructions, which when executed by a set of one or more processors, cause said set of processors to perform operations comprising:

storing a first set of configuration information for a non-virtual private network (VPN) customer;

storing a second set of configuration information for a first layer 3 VPN, the second set of configuration information including a first value identifying the first layer 3 VPN;

associating the first value with a first route distinguisher (RD);

storing a third set of configuration information for a second layer 3 VPN, the third set of configuration information including a second value identifying the second layer 3 VPN;

associating the second value with a second RD;

creating a first exterior gateway protocol (EGP) table and a first routing table for the non-VPN customer;

creating a second EGP table for the first and the second layer 3 VPNs;

creating a second routing table for the first layer 3 VPN and a third routing table for the second layer 3 VPN;

mapping between the first value and the first RD to communicate modifications and to service requests for a set of entries in the second EGP table, the set of entries corresponding to the first layer 3 VPN.

27. The machine-readable medium of claim 26 further comprising mapping between the second value and the second RD to communicate modifications and to service requests for a second set of entries in the second EGP table, the second set of entries corresponding to the second layer 3 VPN.

28. The machine-readable medium of claim 26 wherein each of the set of entries in the second EGP table indicate the first RD.

29. The machine-readable medium of claim 26 wherein the non-VPN customer and a customer provided the first layer 3 VPN are the same entity.

30. A machine-readable medium that provides instructions, which when executed by a set of one or more processors, cause said set of processors to perform operations comprising:

maintaining a first set of information for a first layer 3 virtual private network (VPN), the first set of information including a first value identifying the first layer 3 VPN;

separately maintaining a second set of information for a second layer 3 VPN, the second set of information including a second value identifying the second layer 3 VPN;

associating the first value with a first route distinguisher;

associating the second value with a second route distinguisher; and

maintaining a single exterior gateway protocol (EGP) table for the first and second layer 3 VPNs.

31. The machine-readable medium of claim 30 further comprising:

separately maintaining a third set of information for a non-VPN customer, the third set of information including a third value identifying the non-VPN customer; and

maintaining a second EGP table for the non-VPN customer.

32. The machine-readable medium of claim 30 further comprising:

maintaining a first routing table for the first layer 3 VPN;

maintaining a second routing table for the second layer 3 VPN;

updating a set entries for the first layer 3 VPN in the single EGP table, each of the set of entries indicating the first route distinguisher;

mapping the first route distinguisher to the first value; and

indicating the mapped first value in communication about the updated set of entries.

33. The machine-readable medium of claim 30 further comprising:

maintaining a data structure for the single EGP table, the data structure indicating the association between first value and the first route distinguisher and between the second value and the second route distinguisher; and

performing mappings between the first value and the first route distinguisher and between the second value and the second route distinguisher with the data structure.